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CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 21 August 2003 with an application for Letters Patent number 527738 made by Dairy Tech International Limited.

Dated 27 August 2004.



Neville Harris
Commissioner of Patents, Trade Marks and Designs



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527738

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PROVISIONAL SPECIFICATION

Fused Cheese Processing Apparatus

We, Dairy Tech International Limited, a New Zealand company of 486 Alexandra Street, Te Awamutu, New Zealand do hereby declare this invention to be described in and by the following statement:

- This invention relates to cheese processing apparatus and in particular to an apparatus for processing cheese to and /or through a fused state. More particularly, the substance of the invention resides in apparatus for and methods of handling the dewatering and other manufacturing stages inherent in cheese producing. There are many variations of these basic
- 5 stages ranging from the initial draining of the cheese and whey mixture, cheddaring to a hard or solid state through to salting, mellowing and block forming including forming larger blocks from several smaller blocks smaller blocks. Herein we use the terms "fused cheese" and "cheese mix" to cover these various forms and stages of dewatering and fusing involved in what is substantially continuous cheese production.
- 10 It is well known to form pillars of fused cheese by utilising drainage towers to dewater the cheese mix therein. Typically the towers are of an elongate upright form having a chamber in which the cheese pillar forms. The chamber is typically in the form of an elongate column and is perforated for at least some of its length. The precursor cheese mix drains or deters through to form a pillar of fused cheese. Drainage or dewatering results primarily from
- 15 the weight of the pillar of cheese, both mix and fused compressing itself and forcing water therefrom through the drainage perforations. Drainage and fusion can be enhanced by various means such as by heating the wall of the chamber and/or the application of vacuum to the surrounding drainage manifold.

For various reasons there are limitations to the capacity of the towers. To some extent, in

20 some cases this is overcome by providing a plurality of towers having a common input. Problems can also arise downstream of forming a cheese pillar or pillars. Traditionally blocks are severed from the pillar(s) and these are transported, such as by conveyers, to other apparatus for further processing. The downstream processing can include merely re-blocking,

that is, forming larger blocks from several smaller blocks severed from the pillars. This need for multiple towers and handling to downstream reconstituting processing apparatus can be costly. One of the major costs is the need for a considerable footprint in which to house the various apparatus. An object of this invention is to reduce the footprint and thus capital as well as running costs involved in such cheese processing or at least provide the public with a useful choice. It is also envisaged that the invention will be suitable for use in some other cheese manufacturing stages where dewatering and/or fusing is required.

According to a first aspect of this invention there is provided a cheese processing apparatus broadly comprising an elongate upright drainage column adapted to form a pillar of cheese therein and incorporating as a lower end outlet thereof means for detritusing the pillar of cheese and enclosed transporting means for feeding the detritus cheese to downstream processing means.

According to a second aspect of this invention there is provided a cheese processing apparatus as described in the preceding paragraph wherein the detritusing means includes crumbling means.

According to a third aspect of this invention there is provided a cheese processing apparatus as described in either of the two immediately preceding paragraphs wherein an effective seal is formed at the transition of the pillar of fused cheese to the detritusing means to substantially prevent air entering the pillar of fused cheese via the detritusing means.

According to a fourth aspect of this invention there is provided a cheese processing apparatus as described in any one of the three immediately preceding paragraphs wherein the detritusing

means deposits the detritus cheese into a hopper and the transport means comprises an auger disposed in an outlet from the hopper.

In further describing the invention reference is made to the accompanying drawing of a preferred embodiment. A drainage tower 5 includes a support frame 15 and preferably has an input 4 at an upper end thereof for cheese mix supplied such as via a hopper 1 and associated blower or pump 3 preferably through an airlock valve 2. The tower 5 is preferably cylindrical in cross-section and has an annular cheese pillar forming chamber 18 with both internal and external drainage manifolds 8. Preferably the internal drainage manifold 8 is connected to the outer manifold 8 at their lower ends by a radially disposed conduit(s) 19. Preferably the conduit 19 is "knife-edged" on its upper side to reduce hindrance to the descending cheese pillar.

Chamber 18 is vented at 7 and preferably includes a substantial upper section 17. It is envisaged that section 17 will, under normal working conditions not become charged, thereby providing a corresponding buffer zone between the input and output capacities of the tower 5.

It is envisaged that this feature coupled with the detritusing means described in more detail below for working the fused cheese at the output of the tower 5 will enable the tower 5 to have a substantially larger volumetric capacity than known towers.

At a lower end the chamber 18 preferably includes a cylindrical to rectangular transition section 16 leading to detritusing means. The detritusing means preferably includes a rotary cutting device 10 to substantially continuously detritus the lower end of the pillar of fused cheese formed in the chamber 18. Preferably the structure of the transition section and /or the detritusing means provides for the sealing off of the pillar of fused cheese at this stage to

substantially prevent air venting into the pillar at this juncture. The detritusing means may include a secondary crumbling means 20 to further detritis the fused cheese.

Preferably the detritusing means deposits and/or further works the detritus cheese into a hopper 11. Preferably the hopper is disposed directly beneath the chamber 18 to thus be gravity fed from the detritusing means. The hopper 11 preferably form part of the tower 5 structure and is preferably enclosed. At an outlet of the hopper 11 transport means such as an auger 12 is provided to pump the detritus cheese through an airlock 13 controlled enclosed conduit to downstream processing means as indicated by arrow 14.

DAIRY TECH INTERNATIONAL LIMITED



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